EXHIBIT J

CONFIDENTIAL

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF TEXAS

HOUSTON DIVISION

In re ANADARKO PETROLEUM CORPORATION SECURITIES LITIGATION	§	Civil Action No. 4:20-cv-00576
	§	CLASS ACTION
	§	The Honorable Charles R. Eskridge III

CORRECTED EXPERT WITNESS REPORT

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27. When no OWC is encountered in a well, the pressure gradient of the water column can be based on results from another down-dip well. However, the key issue is that the down-dip water column must be in pressure continuity with the up-dip oil column to establish the OWC. Sealing faults between the water and oil leg would prevent such pressure continuity; lateral continuity of the sands is a critical factor in assessing whether a well provides valuable information about the depth of OWCs.[7]

28. Shen-2, drilled in early 2013, encountered 1,000 ft. of oil pay in what Anadarko identified as eight zones. MDT pressures showed as many as six different pressure trends[8] in the Wilcox sands, signaling a very high degree of pressure compartmentalization vertically. In addition, the MDT pressures proved that Shen-1 and Shen-2 were isolated from each other, most likely by a fault. Each sand was filled to the base with oil, so no pressures in the water leg were available to infer an OWC.

29. Anadarko's Development Team and partners were rightly concerned when they also discovered unusually high AOPs. When AOPs are high, this increases the impact of flow barriers because the operation will require either substantial aquifer support or water injection to prevent premature dropout of asphaltenes in the reservoir and wellbore. Once the pressure falls below the AOP, permeability is badly damaged by introducing solids blocking the pore throats.[9] In other words, the presence of high asphaltene pressures requires more expensive solutions (*e.g.*, aquifers, water injectors) and negatively impacts oil flow and extraction.

30. An email[10] from Dan Bradley with COP to Lea Frye demonstrated the importance that these uniquely AOPs) had on lowering recovery by as much as one-third. The reduction in recovery resulted from raising flowing pressures to prevent asphaltene deposition in the reservoir.

> *"The AOPs were higher than anything we had seen before and we're trying to understand the implications."*
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> *"Yesterday, I ran a test case in which I switched from THP control to BHP control, to ensure that the FBHPs remain above 15,000 psi. As you would guess, the rates fall off much faster and I lost about a third of the recovery. We've been setting up an in-house water injection study, because we too see the potential for augmenting recovery. Now, however,* ***I'm wondering if water injection needs to become the base case assumption in order to protect us from asphaltene precipitation in the reservoir****. Thus, our understanding of the new data and where it is driving us is*

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[7] Oil water contacts (sometimes referred to as "OWC" in the industry) define the boundary at which oil or water flow. Above the OWC, less-dense oil will flow and below the OWC, denser water will flow. The depth of the OWC is the downdip limit of the oil accumulation. With a structural map of the reservoir interval, the OWC can be used to determine the areal extent of the oil accumulation.

[8] APC-00592977 dated 11/14/13, page 22.

[9] The pore throat is the opening connecting two pores, allowing fluid to flow between the pores. A large pore throat allows fluid to flow freely, resulting in high permeability, and a narrow pore throat impedes fluid flow resulting in low permeability.

[10] Impact discussed in APC-00003707 dated 2/20/14, first mentioned in APC-00578964 on 5/16/13.

really important to us right now as we work through the forecasting and economics to support the well AFE." (Emphasis added.)

31. The potential for north-south faulting impacted the uncertainty in resource size because the Shen structure is highly elongated along an east-west axis. With sealing north-south faulting, each potential fault block would need to be tested, and extrapolations of oil and aquifer gradients located miles apart would be unreliable in determining the depth of OWCs without sound evidence of pressure continuity between wells.

32. The presence of east-west faults would be even more detrimental to the feasibility of Shen commerciality for several reasons. With no faulting, the primary direction of aquifer flow would be up-dip from south to north, and permeability barriers running east to west would block or inhibit aquifer support to up-dip producers. Without aquifer support, injection wells would need to be paired with producers in each of the isolated fault blocks targeted to be developed, increasing the number of critical appraisal and development wells. In addition, the presence of east-west faults would invalidate the inference of OWC depths from down-dip wells.

33. Structural maps of Shen showed faulting as early as mid-2012[11] and into 2013, raising the above-mentioned red flags for the project.

34. A presentation dated March 1, 2013[12] shows a faulted structural map in Exhibit 4 of the Shen field on the LWA horizon, likely authored by Rodriguez, as he is listed as the geophysicist on the title page. This map predates Shen-2 and is an early version of the Development team's interpretation of the extent of faulting based on the available seismic data. Faults are the white linear features on the LWA structure map.

[11] FRYE-002694 dated 8/12/14.

[12] APC-00793752 dated 3/1/13, but the date is uncertain and may be 7/12/12 based on file name and title page "2012-07-12_Foldbelt_Shenandoah_WilcoxA_structure.ppt."

words, the assumed cost reductions were not based on actual cost improvements, and even with them in place, Shen was not economic at $60/bbl.

L. Post-Shen-4: Asphaltene Test Results of Commingled Oils

261. Another major issue arose from the testing of commingled oil samples that seriously threatened the viability of commingled completions. AOP tests of commingled Shen oil samples yielded very negative results as communicated on October 21, 2015 by Fyfe with Corelab, who performed the tests. Oil samples from the LWC, LWD, and LWE zones were combined at initial pressure and temperature, and a substantial volume of asphaltene had already dropped out of solution above 19,500 psig. The constraint of having to maintain reservoir pressure above the single zone AOP was already recognized as crucial, and commingling production from multiple zones made asphaltene deposits an even worse threat to Shen's economic viability. Corelab's technician even apologized for delivering[218] the bad news.

> *Corelab:* "*I can tell you that we prepared the volumetric blend of the fluids in a cylinder as per your instructions and homogenized however upon charging the blend to the AOP unit the fluid was observed to have already flocculated asphaltene. We homogenized the fluids at 19,500 psig for about 12 hours in the unit prior to performing a pressure reduction study to confirm that the flocculation did occur above the charge pressure*."
>
> "*Either way I apologize for the bad news but hope that you can gain some information from the data generated*."

262. A subsequent email[219] on October 30, 2015 stated the volume of asphaltene dropout was unusually large by describing it as a "*fantastic amount of asphaltene*." The volume of the deposit matters because the more asphaltene that deposits from the oil causes the reservoir, production tubing, and tie back lines to plug more rapidly.

> *Corelab:* "*When we took the blending cylinder apart for cleaning there was a fantastic amount of asphaltene present in the top of the piston of the cylinder*."

263. Commingling the crude oil from three zones of Shen-2 caused the dropout pressure to rise by several thousand psi, greatly increasing the locations and conditions in which asphaltenes deposit and block flow. The unblended AOP was 11,700 psig for the LWC oil, 13,500 psig for the LWD oil, and 5,500 psig for the LWE oil, compared to the blended AOP of 19,500 psig.

264. With such a high AOP, the phenomenon of crossflow is likely to damage the reservoir when zones are commingled. When a well is shut in at the surface, crossflow occurs downhole when the formation pressures of zones open to the completion have separate pressure gradients, and the zone with the higher-pressure gradient flows into the lower pressure zone. Formation permeability can be damaged as fluid mixes in the formation and pressure eventually depletes below the AOP of 19,500 psig. Wells need to be shut in for various reasons, so the

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[218] APC-00052393 dated 10/21/15.

[219] APC-00053552 dated 10/30/15.